MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

MGA BULLETIN

OCTOBER, 1954 · NUMBER 58

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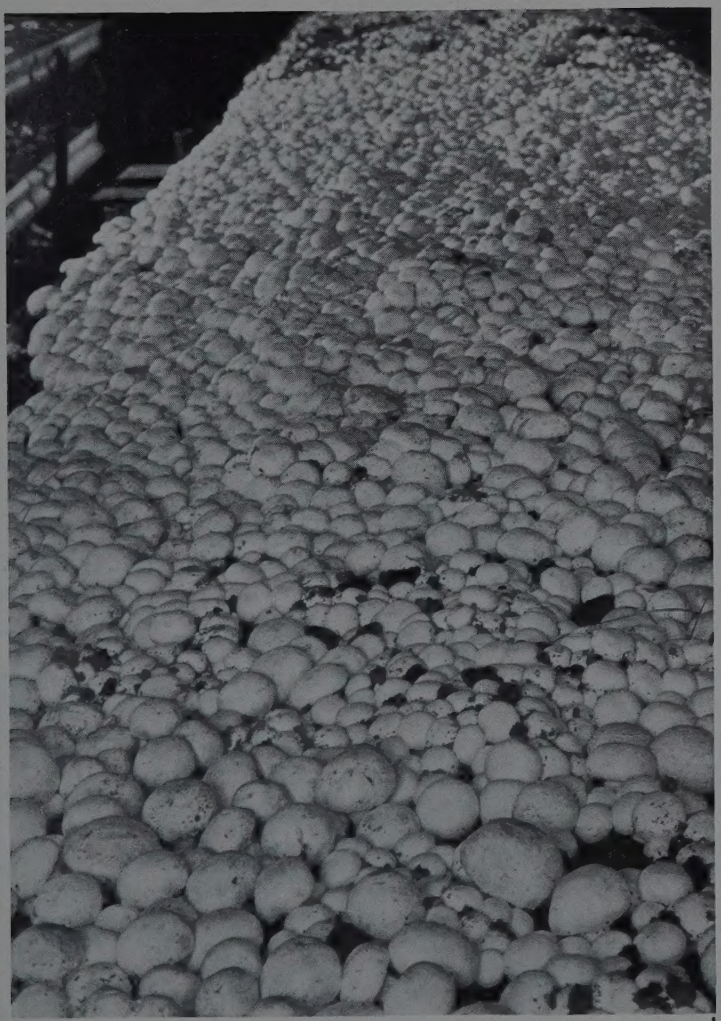

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The MGA BULLETIN
OCTOBER · 1954
NUMBER 58

EDITORIAL

The Chairman welcomes you to TUNBRIDGE WELLS

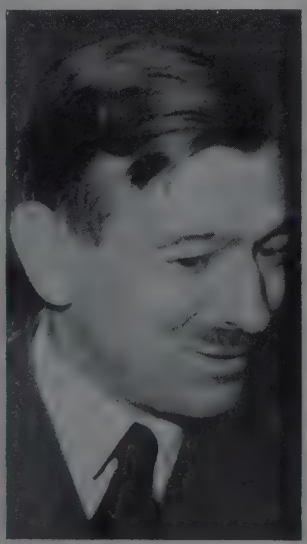
The first week of October is the high spot of the year for MGA members. To Tunbridge Wells will come growers from all parts of Great Britain. In addition we expect to welcome many members from overseas.

On Wednesday, 6th October, the Third Annual Mushroom Industry Exhibition will be open to members at 10 a.m. in the Assembly Hall, at Tunbridge Wells.

In the evening the Mayor is most kindly giving a reception to the Association in the Elizabethan Barn, at 9 p.m.

This year, at the request of the Trade Exhibitors, we are throwing the exhibition open to the public on Thursday, 7th October. We do not know to what extent the public may be interested in a show staged primarily for growers, but we think that the cooking demonstration will prove to be of great interest, and the appearance of Miss Anne Cullen of " The Archers " cannot fail to be a great attraction.

Further, with the co-operation of the local retailers the inhabitants of Tunbridge Wells will not be left in any doubt that mushrooms are an indispensable article of diet.



While, on Thursday, the exhibition will open to the public, the A.G.M. will take place in the Council Chamber, at 10 a.m., to be followed by the Reception and Annual Luncheon.

We have to postpone the pleasure of welcoming Mr. T. Ainslie Robertson, as our guest of honour. Until recently he was Chairman of Plant Protection Ltd., and is now Chairman of the new Research Institute at Littlehampton. As this station has now taken over and is continuing the work of the MRA from Yaxley we should have been very glad of the opportunity to introduce him to members. As he has had to go to Australia on professional business, we have had to forego the pleasure of making his acquaintance this year. At short notice **Mr. E. H. Gardener,** Chairman of the Central Horticultural Committee of the NFU,

has very kindly consented to take his place. As a proved and valued friend of the MGA we shall be very happy to have him with us.

In the afternoon there will be a Brains Trust. Lest there should be any doubt, it is not to be supposed that all the brains will be on the platform!

Finally, a word of welcome to all members, non-members, wives, foremen and employees engaged in the Mushroom Industry, for whom this Exhibition is staged.

G. P. LAWRENCE.

Dr. C. J. LA TOUCHE finds . . . . . .

'ROSE COMB'
in the St. George's Mushroom

These St. George's Mushrooms (*Tricholoma gambosum*) were found with normal specimens on a grass verge beneath horse chestnut trees on 6th June, of this year in an outlying district of Leeds. The road along which they may be found every year is private and has not been repaired for a long time although it is much used by motor traffic, there is therefore no likelihood of these specimens having become contaminated by creosote or tar. Injury caused by pressure and friction of young caps pressing against overlying strands of dead grass during their development may have been a predisposing cause of the 'Rose Comb'.

A crop of these mushrooms has been collected by me each year for the past four years. They begin to appear on or about St. George's Day and may be found up to the middle of June. They have an odour and flavour of new meal and are good to eat either fried in butter or stewed in milk. I have grown the mycelium from young fruit bodies quite easily on honey and peptone agar but so far have not tried any in compost.

The St. George's Mushroom is a close relative of the Blewit (*Tricholoma personatum*) which was once sold in quantity in Covent Garden and which incidently is common in parts of Yorkshire.

NEW HONORARY MEMBERS

Day, Gerald W., 29 Derek Road, North Lancing, Sussex.
Hunter, Miss E., 117 Bargates, Christchurch, Hants.
Fairchild, Peter, 6 Broad Park Crescent, Ilfracombe, N. Devon.
Poloch, H., P.O. Box 13, Woiumi-O-Mata, New Zealand.
Britton, Major B. G., M.B.E., Mundesley House, Mundesley, Norfolk.
Kennedy, F. R., Mill House, Kilcully, Cork, Eire.
van Straubenzee, Lt. Col. P. P., D.S.O., Spennithorne House, Leyburn, Yorks.
Casswell, Wood (Manchester) Ltd., Smithfield Market, Manchester 4.
Blake, R. L., Garden Cottage, Norton Grange, Sunninghill, Ascot, Berks.
Dark, A. Reginald, Krad House, Solihull Road, Shirley, Warwickshire.
Dietrich, N. Lother, Burggarten 1, Hamburg 26, Germany.
Hewitt, Ivor, 12 Greenclose Lane, Loughborough, Leics.
Watson, R. B., Montague Products Co., Bark House Farm, Hoyland, Nr. Barnsley, Yorks.
Harrington & Jessup, Agricultural Contractors, 57 Abbey Road, Horsell, Woking, Surrey.
Rodgers, W. E., The Clinic, 88 Meadow Lane, Leeds 11.
Rose, Alfred G., The Castle, Fillingham, Nr. Lincoln.
Richards, John F., Woolhams Bank, 73 Harestone Hill, Caterham, Surrey.
Fuller, Mrs. Ruth M., Park House, Thorney, Nr. Peterborough.
Pratt, C. S., 11 Scotlands Road, Coalville, Leics.
Danford, Roy H., 11 Sinodun Road, Wallingford, Berks.
Cooper, Frank (Canterbury) Ltd., 2 Watling Street, Canterbury, Kent.
Dorothy, F. P., " Fernlea," Ballamodha, Malew, Isle of Man.
Marshall, W. (Hessle) Ltd., The Cliff, Hessle, E. Yorks.
Kaye, Enos, Castlefolds Market, Sheffield 1.
County Agricultural Officer, Sussex (West) Agricultural Executive Committee, 40 North Street, Chichester, Sussex.
Davy, D. C., Salmons House, New Road, Crickhowell, Brecs.
Peters, J. & J. H., Printing Office Street, Doncaster, Yorks.
Fennah, G. R., Highfield, Wormbridge, Hereford.
Dumont, M., Chassart, Belgium.
Fairweather, A., Scott Lane, Bardsey, Nr. Leeds.
Bowditch, A., 82 Cumbrian Way, Millbrook, Southampton.
Grainger, Walter, 62 Beaumont Hill, Darlington, Co. Durham.
Brantom, Shirley & Co. Ltd., Vicarage Wharf, Battersea, London, S.W.11.
Lessels, H. C., Blackness Castle Restaurant, Blackness, W. Lothian, Scotland.
Oscander, Karl, c/o Alimento Co., Partille, Sweden.
Gaw, Thomas, 20 Corrie Crescent, Saltcoats, Ayrshire, Scotland.
Collington, J. E., Balmer Lawn, 60 Hull Green, Malvern, Worcs.
Pledger, G. E., 32 Coombe Rise, Worthing, Sussex.
Dimm, S. D., 850 Thornton St., San Leandro, California, U.S.A.
Figgis, F. G., 72 Stafford Court, Kensington, London, W.8.
Millard, T. P., Riverside, Cliff Road, Hessle, E. Yorks.
Busch, T. C., Dyerville, Martinborough, Wellington, N. Zealand.
Scott, W. J., " Dunkerron," Greenfield Road, Sutton, Dublin, Eire.

FRENCH GROWERS' MEETING

Some important decisions were made at the Annual Meeting of the French Mushroom Growers' Federation in June.

The first project introduced by the President, M. P. Guiochon, was **the establishment of a pilot plant, to be run as a commercial farm,** at a profit, to practise new methods and improvements on old ones so that growers could learn to use them on their own farms. Examples mentioned were the use of activators with excessively strawy manure, and with straw alone to make synthetic compost. Another function of the pilot plant would be the properly organised training of young growers.

M. Guiochon announced that the Ministry of Agriculture favoured the project on condition that the pilot plant was situated in a centre of mushroom growing, and that the possible loss on running it was not greater than the cost of the Federation's present experimental programme.

There was considerable discussion about details of the objects, financial aspects, possibility of buying a suitable cave, and management. Doubts were expressed about the possibility of running it at a profit.

The President explained the Committee's view that the best arrangement would be to form a co-operative society for the purpose, because this would enable them to obtain a long-term loan from the National Agricultural Credit organisation, and to limit the liability of members. Membership would be open to all, and all members would be able to participate in the work of the pilot plant so that they could learn in a practical way how to use modern methods and apply them on their own farms.

At the end of the discussion it was agreed in principle to buy a cave where research work and a pilot plant could be centralised, and for this purpose to form a co-operative society with as large a membership as possible. No decision was made as to the Society's capital; during the discussion capital of 10 million francs (about £10,000) had been mentioned, of which 7 millions could be borrowed and 3 millions would have to be subscribed by growers. Interest would be paid on both loan and subscriptions. It was also agreed that a suitable manager should be found to run the pilot plant.

It is interesting in connection with this proposal to note that a similar idea has frequently been discussed as a means of paying for mushroom research at Yaxley. The purpose of the French pilot plant is of course closer to commercial growing than a research programme, so that it bears less of the extra costs and risks of detailed experimental work.

The second important new proposal was **to establish a publicity campaign**, with the immediate object of expanding consumption of mushrooms and so preventing or reducing the seasonal fall in prices which usually occurs in France in September. For this purpose it would be necessary to raise the necessary funds and act promptly.

A Publicity Committee has been formed and has started work. A fund of 4 million francs was considered necessary and for this it was proposed to raise a (voluntary) subscription of 2,000 francs per employee from members of the Federation.

Introducing this project, M. Guiochon referred to the success of the pre-war publicity campaign, when sums equivalent to a present day value of 3 million francs a year were spent.

Other points mentioned in a first report by the Publicity Committee were that September is the time when wild mushrooms of various kinds, more widely sold and eaten in France than they are here, would be serious competitors, and that the Press tend to publish articles about them at that time, drawing interest to them at the expense of the cultivated mushroom. Efforts should be made to counter this tendency. If the selling price of fresh mushrooms was allowed to fall, this would be followed by a fall in the price paid for mushrooms for canning, which form a substantial part of French mushroom output.

It will be interesting, particularly in view of our own schemes, to watch the progress of the French publicity campaign; and of course good prices on their home market reduce the quantity of French mushrooms sent here. **R.L.E.**

THE FRED. ATKINS ALPHABET–L

La France Disease. This is the name given by Dr. J. W. Sinden in 1948 to a strange and frightening disease he observed on the mushroom plant of the La France Brothers at Upland, Chester County. The mushrooms had very thin long stalks and globular thin-fleshed caps, and " they died in a rather soft rot turning slightly brown but not dark . . . . . No statement can be made yet as to the cause of the disease," but troubles closely resembling La France were seen in England in 1953, and again this year.

Labour. The labour required on a farm seems in England to vary between one and two workers per 2,000 sq. ft. of cropping area.

Larvae. The larvae or grubs of the Sciarid fly have a black head and measure 6 to 7 mm. in length. The larvae of the Phorid fly have no black head and are about 4 mm. long. The larvae of the Cecid fly often have an M-shaped structure (or " anchor process ") near their heads, and measure about 2 mm. in length.

Lepidocyrtus. The " silvery springtail " which feeds on spawn is *Lepidocyrtus cyaneus.* Dr. A. M. Kligman reports that the " red springtail " (*L. lanuginosus*) is rather uncommon but extremely injurious when abundant.

Leptocera. The larvae of the *Leptocera heteroneura* fly has been found to damage mushrooms on occasion.

Library. One of the most useful features of the MGA service is its comprehensive library of textbooks and technical papers.

Light. Mushrooms *don't* need it, but it does no harm. Direct sunlight should be avoided.

Lignin. The woody " skin " of straw. Opinions differ on whether it is a source of food for the mushroom.

Lime. In one form or another, lime is generally added to the casing material to adjust its pH to neutral or to " buffer " it (*i.e.*, to prevent the pH value from falling rapidly). P. B. Flegg recently pointed out that different forms of lime have different neutralizing values, and quoted approximately 1 lb. ground chalk (or carbonate of lime, or calcium carbonate)=$\frac{3}{4}$ lb. slaked lime (or hydrated lime, or calcium hydroxide)=$\frac{1}{2}$ lb. quicklime (or calcium oxide).

Lime Sulphur. It is rarely suggested nowadays for the washing down of mushroom houses, but some growers use it to disinfect and preserve their trays.

Lindane. The odourless form of BHC, to be preferred if the compost is later to be used as a fertilizer for root crops.

Linopodes. The long-legged mushroom mite *Linopodes antennaepes* moves very fast and is believed by many to be harmless; but it has nevertheless been known to sever the strands at the base of the mushroom. ALL mites are unwelcome.

Louvres. If there were such a thing as a " standard " mushroom house it would almost certainly have a permanently-open louvre or ventilator along the apex of its roof.

Loveday Committee. The Joint Advisory Committee on Agricultural Education.

Lucerne. Lucerne, or alfalfa, can be a valuable nitrogenous addition to long-straw or synthetic composts. Rarely used in Britain, because of its cost or its use as animal feed.

GREETINGS FROM ABROAD

I have just returned from a quick survey of growing and mushroom research in Belgium, Denmark and Sweden, and bring back with me greetings to all members of the MGA from Guy de Man, C. R. Rasmussen, Peter Jorgenson, Miss Ingrid Ohman, Harald Stridsberg, Gunnar Westin, B. T. Wendler, and A. Wiberg. I had hoped to see Professor A. Willam, too, but to my dismay found he had been involved in a motoring accident in Holland and was in hospital. All members will wish him a speedy recovery. **F.C.A.**

The late Mr. S. Nelson : Confirmation has been received of the sad news that Mr. SAM NELSON, representative of Northern Ireland on the MGA Executive, was killed in a recent motoring accident.

YOUR PESTS AND DISEASES

By **Miss D. G. GANDY, M.Sc.**
Mycologist to the MRA at Yaxley

With the closing of the Yaxley laboratory the advisory service in its present form will cease. It is of interest therefore to consider some of the problems which have been brought to light through the examination of samples sent to Yaxley. A perusal of the records (kept since 1949) of samples sent to the Microbiology Department for examination shows that there have been marked changes over the years in the types of trouble for which growers have had to seek advice. In 1949, *Verticillium* was diagnosed eight times and *Mycogone* six. Last year we received one sample of *Verticillium* and none of *Mycogone*. It seems certain that most mushroom growers can now recognise these parasitic diseases without outside help. Other fungi such as truffle, white and brown plaster moulds have been found much the same number of times each year. The latter is one of the fungi most commonly found in samples, but in the majority of cases it is not the chief cause of trouble. It is most frequently found in dark soggy compost in which the mushroom mycelium has either failed to grow or, more often, where it is being attacked by pests.

The status of bacterial diseases is doubtful except in the case of bacterial pit which is a well defined disease and one which is easily recognised. Many times mushrooms have been received having blotched or sticky, discoloured caps. Obviously bacteria are present but are they the primary cause of the condition? Watering and the use of chemicals can cause blotching, lack of ventilation, especially after watering can make the caps sticky, and such samples are not improved by spending 24 hours in the post. These difficulties should be borne in mind by growers who have sent such mushrooms in the past and have received a somewhat vague reply to the effect that the trouble appeared to be a bacterial rot.

Another problem which awaits clarification is at present given the non-committal title of "Yellow moulds." It was the routine examination of samples which established the fact that several entirely different fungi were masquerading under the name of " Vert de Gris " whereas none was entitled to be so called. Three basic questions require to be answered in connection with these moulds: What are they? Are they harmful? If so, how can they be eradicated? The answers are not yet known and it will be some time before they are. A comparison of the data supplied by growers might be expected to give some clues, but all too often there is no factor common to all cases; for instance, one mould may be found in compost with a low pH, another time it is found in compost which is satisfactory in that respect; one grower may complain that his mould is reducing crops while another with the same mould may claim to be having excellent crops. A fungus present in compost may not in itself be harmful but may indicate that it is either physically or chemically not suitable for optimum mushroom growth.

It is true to say that pests have been more frequently found in samples than fungal or bacterial diseases, and of these, cecids and eelworms are by far the most commonly encountered. There has, moreover, been an ominous increase in eelworm infested samples received during the past two years, and these two now head the list of mushroom menaces. Flies, whilst they can be serious, nevertheless have a vulnerable stage in the life cycle, namely the adult fly, when they can be sprayed, dusted, gassed or otherwise dealt with, without disturbing the mushrooms unduly. Cecids and eelworms, on the other hand, spend their entire lives in the compost or soil (the rare cecid fly can be disregarded for all practical purposes) and whilst there are chemicals which kill these pests the problem is to reach them. With fumigation, penetration of gases through the compost would be slow and uncertain, and the drenching of beds with chemical solutions is out of the question. Spraying of beds with DDT has met with some success in dealing with cecids, but generally only a small fraction are ever touched. It is in dealing with these two pests that care in the cleaning of empty houses is well repaid, for inefficient cleaning may result in their reappearance in the following crop. In this matter of hygiene the composting floor is all too frequently neglected.

Eelworms are broadly grouped into saprophytic and parasitic types. Saprophytes feed on bacteria and decaying material, but while they do not harm mushroom mycelium directly, they secrete toxins, and if present in large numbers may have a detrimental effect on the mycelium. Their presence in large numbers indicates that all is not well in the bed and that it has probably started to decay. *Ditylenchus destructor*, the potato rot nematode, is a parasite which attacks not only the potato but also mushroom mycelium. If present in the compost at filling, they can be killed by peak heating at 130° F., but unless *all* parts of *every* bed or tray reach this temperature, some will escape. After peak heating nothing more can be done except to prevent the introduction of infected material. Spent compost, especially if already infested, must be disposed of carefully, and fragments should not be left lying about where they can be picked up on boots and taken into houses. Flies are also known to be transporting agents for some types of eelworm.

Compost samples have frequently been received where the whole mass has become dark brown, soggy and evil smelling, and the eelworm population is so great that all the fine mushroom mycelium has been destroyed. When matters have reached this stage the only thing to do is to empty and start afresh, because the mycelium will never grow again. If the trouble is located in time its spread can be retarded by cutting out the affected parts plus a good portion of the surrounding apparently untouched compost. Any woodwork in contact with the infested compost should then be disinfected, preferably with a chlorophenol nematicide. Unfortunately eelworms are seldom confined to one spot and this procedure will only slow down the rate of spread.

It will be argued by some growers that since eelworms are microscopic in size they cannot be certain that their trouble arises from this cause. This is so, but anyone who has seen a good sample of infested

compost will have no difficulty in recognising its appearance and smell afterwards. In any case if, on examination, the fine mycelium has disappeared from the compost and only the coarse strands are left, the chances that it will grow again are small. " When in doubt, throw it out " may seem a harsh creed, but it is generally the wisest course to pursue.

So far I have mentioned only those samples where the probable source of trouble has been located. It is inevitable that in a proportion of cases nothing has been found to account for the trouble reported. This is not surprising when one considers how little we know even now about the mushroom itself. The dying off of buttons and the formation of hard veil-less and gill-less mushrooms have puzzled many growers at different times, and in this connection it must be remembered that compared with green plants the mushroom is a primitive organism which can respond to external stimuli in a very limited number of ways. Thus the two symptoms described may each have more than one cause, and these causes may be physiological rather than pathological. To establish the cause of such symptoms would require an extensive programme of research in both these fields.

In conclusion let it be said that the running of an advisory service can be of benefit not only to the sender of samples but also to the recipient. The laboratory staff are able to see material in the form of samples from far more farms than they could hope to visit personally. Samples and their covering letters indicate which lines of investigation would benefit the greatest number, and often give some clue as to the best method of tackling the problem. In short, they form a valuable store of information which is of benefit to all concerned with mushrooms.

LAUGH THESE OFF !!!

The Age of Miracles . . . .

Said a lady visitor to the MGA Stand at Chelsea: " Every year we sow some poppy seeds and every time we get mushrooms ".

Long running Spawn ?

Another lady vistor to the MGA Stand: " We put down some spawn on our lawn every year and each time mushrooms come up three fields away ".

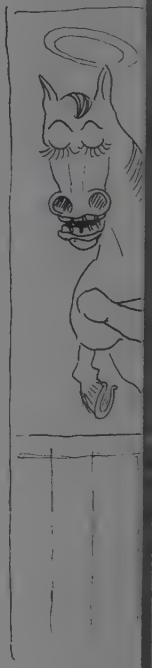
Spawn Makers—Beware !

The *Otago Daily Times* (New Zealand) commenting recently on the supply of wild mushrooms had this to say " One Dunedin resident said yesterday, that he had been picking mushrooms off his front lawn for more than a week. ' I can go out every morning and gather a basketful ' he said, ' but I always make sure that I sprinkle some spores about. Whether or not they grow I don't know but more mushrooms are on my lawn the following day ' ".

"THE WAY OF THE M

The popularity of this leaflet, written at the request of the MGA Executive by Fred. Atki
members it is reprinted here to give it some permanence. Copies for distribution privately

IT is estimated that less than one pound of mushrooms in one year is grown for each man, woman and child in Great Britain, and at times the supply exceeds the demand. As almost everyone loves to eat mushrooms, the reason may be that mushrooms are too expensive. Growers know, on the contrary, that a few mushrooms go a long way, and that it is not necessary to buy a whole pound to make an omelette delectable.



Few things which are really good are really cheap, admittedly. Why are mushrooms no exception? Mainly because they are difficult to grow. Plant a potato and it is almost certain to grow. Plant some mushroom spawn and it is almost certain not to. Ask a mushroom grower why this is so and he'll reply: " I wish you'd tell me!"

Primarily, the mushroom is an extraordinarily sensitive plant and is most exacting in its requirements. If it were not, the country would be overwhelmed, for one mature mushroom produces many millions of seeds (" spores " is the correct term).

The work of selecting suitable spores is a highly technical process demanding laboratory techniques, sterilization and incubation. The mushroom grower has to buy what are in effect growing plants, *over whose infancy he has no control.* Fortunately for the Mushroom Industry these plants (" spawns ", we call them) are now largely dependable, provided they can be given the environment best suited to their needs (which are not the same with every type of spawn).

"... over whose infancy he has no control."

Spawn is sown or planted in compost —not compost in the garden sense, but a medium meticulously prepared to discourage other fungi as much as to stimulate the mushroom. For centuries, compost has been *based on horse-manure*, but of recent years some growers

USHROOM GROWER"

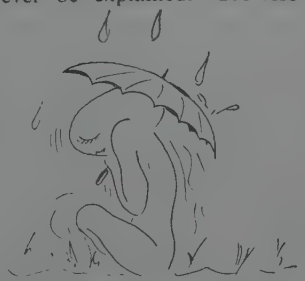
illustrated by Mac Bulloch, *has exceeded all expectations, and at the wish of several through markets or in shops, are available from the MGA Secretary, for 6/- a hundred.*

have been using a synthetic compost. Although almost fresh manure will grow mushrooms, it will also provide food for a great variety of other fungi. It therefore has to be stacked into heaps to warm up and undergo a partial decomposition to destroy the food which the mushroom's competitors enjoy. During this period, lasting a week or a month according to the procedure adopted, about a third of the original weight is lost, but as yet there appears to be no other way to give the mushroom a chance to survive.

When the compost has reached a stage when it answers a number of tests for acidity, water-content and texture, it is placed in boxes or on shelving and subjected to a day or more's pasteurization at temperatures ranging up to 145° F. Not until it has cooled down to 80° F. is the spawn planted.

The attempt is now made to retain a steady temperature and humidity for about three weeks. Too little of either, or too much, is reflected in the year's Profit and Loss Account.

Then comes the strange "casing" operation. For reasons which are not exactly known, better crops are produced if the mushroom plant is suddenly *chilled and starved*, and this cruel act is most simply performed by putting an inch of poor soil on top of the bed and watering it regularly. Too little water—and the bed lies dormant; too much—and it dies. Exactly how much water to add is never known and can never be explained. Growers rely on their experience; instinct plays a bigger part in mushroom growing than perhaps any other branch of Horticulture, despite the rapid advance of Science.



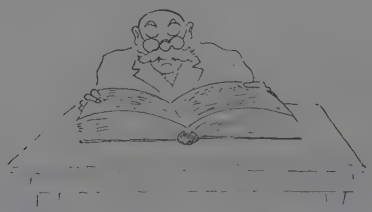
". . . chilled and starved . . ."

So long as nothing radically wrong has been done in the foregoing weeks, and so long as nothing goes seriously amiss in the weeks ahead, the bed produces for six to sixteen weeks. Some intensive

growers pull out at six weeks, others keep picking for as long as possible.

Environment plays an enormous part in the commercial cultivation of mushrooms, and great strides have been made in our knowledge of the plant's requirements. The next logical step is air-conditioning, but the expense is generally regarded as prohibitive at a moment when the upward Costs curve has come so dangerously near to meeting the downward Returns line. Mushrooms do not spring up over-night; but the profit shrinks perceptibly!

What part does the Mushroom Growers' Association play in this story? Anyone who grew before the Second World War will tell you. There was then little research, and what information there was had to be *ferreted out of obscure scientific journals*. The MGA collects, collates and reprints such information in its monthly Bulletin. It also provides a forum for world-wide discussion on controversial problems, arranges meetings and farm walks in Great Britain, stimulates research wherever it can, watches the political scene and makes appropriate representations on national questions and, in a word, is a trade-protection society whose immediate task is to encourage the demand for mushrooms by the publication of original and little-known recipes such as the delicious salad based on fresh, uncooked mushrooms. "M-m-m, Mushrooms!" is its slogan. And remember, please, it is wasteful and quite unnecessary to peel cultivated mushrooms.



"... ferreted out of obscure scientific journals."

MAC'S MUSHROOM FAMILY

10. Bertie Bispora

FIRST STEPS IN GROWING

by McGregor Bulloch

10—CASING MATERIALS

While the spawn is running, there is very little to be done except to maintain an even temperature and moisture content and to keep a sharp look-out for trouble in the shape of disease and insect pests. The next important step is the preparation of a suitable casing material, since the beds or trays will have to be cased within 14 to 21 days of spawning.

If the compost is left uncased after spawning it is extremely unlikely that any mushrooms will appear, although not impossible.

A great number of materials have been tried for casing beds, such as small stones, sand, limestone chippings, chalk, crushed bricks and in fact every conceivable variety of non-organic matter, but, for the beginner, ordinary soil is the safest casing to use. Soil is, of course, chiefly inorganic, but a certain amount of organic matter in the form of humus usually determines its moisture-holding capacity. During the last few years, two varieties of peat, sphagnum moss and sedge, have been used with considerable success, and are in certain cases a great boon to growers with an unsuitable soil.

Some soils are absolutely useless for mushroom growing and the beginner should seek advice from someone with a sound knowledge of the subject. The best type of soil is a medium clay loam, although with suitable treatment a wide range of soils may be used.

It is a good plan to test the soil for physical condition by laying an area of a few square feet indoors, preferably over some compost, and watering it fairly heavily at intervals of a few days whenever the soil becomes dry. By pressing the surface with a fingertip one can find out whether it tends to " pan " or become solid. Such a soil would prevent free air movement between the compost surface and the top of the soil layer, and it would be necessary to mix with it either peat or the ashes from a coke-fired furnace in order to improve its texture.

One of the chief drawbacks with soil is that, unless it can be obtained from at least four or five feet below the surface, it will not be free from spores of mushroom diseases and will have to be sterilized in some way. Steam sterilization is usually the most efficient method to use, but care must be taken to store the soil afterwards in a closed store. Soil normally contains numerous bacteria and fungi which, while being harmless to mushroom growth, help to prevent possibly harmful organisms from multiplying too freely. After the sterilizing process, the majority if not all of the bacteria and fungus spores are killed, and should the mycelium of a mushroom disease obtain a hold, it might spread rapidly through the soil mass with consequent danger to the

future crop. An example of this rapid growth may be seen frequently after steam sterilization, when a strong growth of a pink mould can be seen to develop after a few days. Fortunately this mould appears to do no harm, and after being disturbed and used for casing, the soil shows no further sign of it. The beginner must train himself to observe all these small signs and habits of fungal growth in order that he may develop a proper understanding of what is taking place around him, mostly unseen.

Having obtained confirmation that the soil is capable of producing a reasonably good crop of mushrooms, there are still one or two things to do before the soil is ready for use, as, for instance, the physical test described above in which it is decided whether it will be necessary to open up the soil by the addition of peat or ashes. Another essential test is the taking of the soil pH. Without going into technicalities, the pH number is an indication of the acidity or alkalinity of a substance and ranges between 0 and 14, with pH 7·0 as the approximate neutral point where there is neither acidity nor alkalinity. The range covered by substances used in mushroom growing is roughly from 5·0 to 9·0, although such compounds as hydrated lime reach about 12·0. The mushroom can grow within the limits of 5·0 to 9·0, and since its progress is marked by an increasing production of acidity, it is obviously wise to start with a slightly alkaline soil, somewhere between 7·5 and 8·0. Peat is generally fairly acid, between 5·0 and 6·0, and it has to be treated with neutral or alkaline substances to bring it to the correct state. There are two chemicals which are used normally, and these are calcium carbonate, represented by ground chalk or ground limestone, and calcium hydroxide which is the product obtained by slaking burnt lime with water. It is usually known as hydrated lime, is very alkaline, and consequently the exact amount must be added to correct the pH of the soil, otherwise too high a reading will be obtained. At the same time it must be borne in mind that the action of the atmosphere will gradually reduce the pH of soil which has been over-corrected with hydrated lime.

A much safer material to use is carbonate of chalk, or ground limestone. This, however freely added, does not raise the pH of the soil above an approximately netural point, and an excess helps to counteract the acidifying tendency of mushroom mycelium.

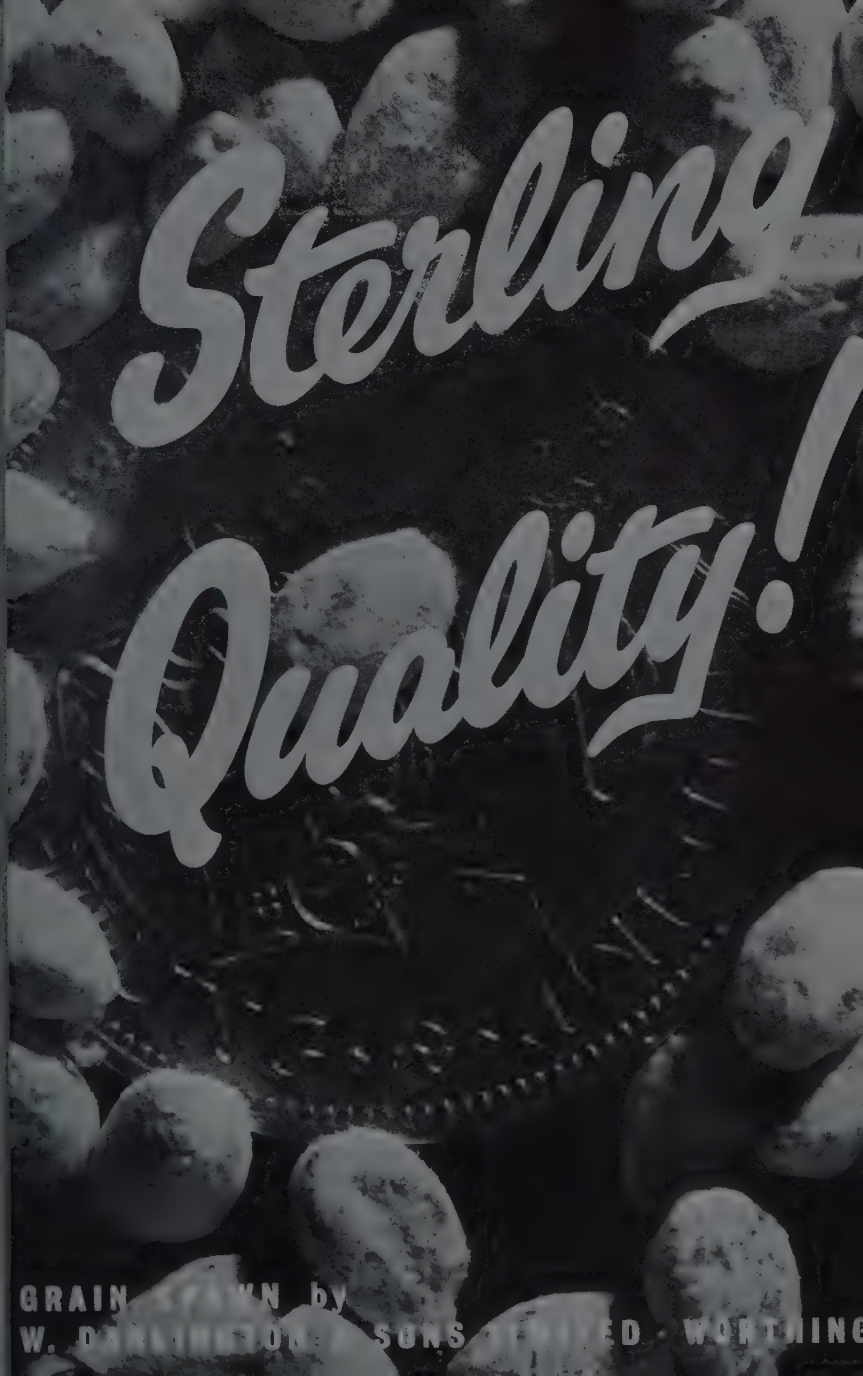
THANK YOU!

The Mushroom Growers' Association wish to acknowledge with gratitude the valuable contribution of £17 7s. 0d. to the Publicity Fund made by Messrs. Stable Manures Ltd.

This firm have ingeniously applied the idea of the Spawn Levy to their own business. They are contributing 1d. to the Publicity Fund for each cubic yard of manure they deliver to Growers, but it must be stressed that this firm is not just collecting money from the Growers. With the interest of the Mushroom Industry at heart, it is paying this levy out of its own pocket.

It is to be hoped that every Manure Dealer will follow this fine example.

RAYMOND THOMPSON.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GROWING IT THE HEART OF LONDON

Novices make success with courageous bomb-site enterprise

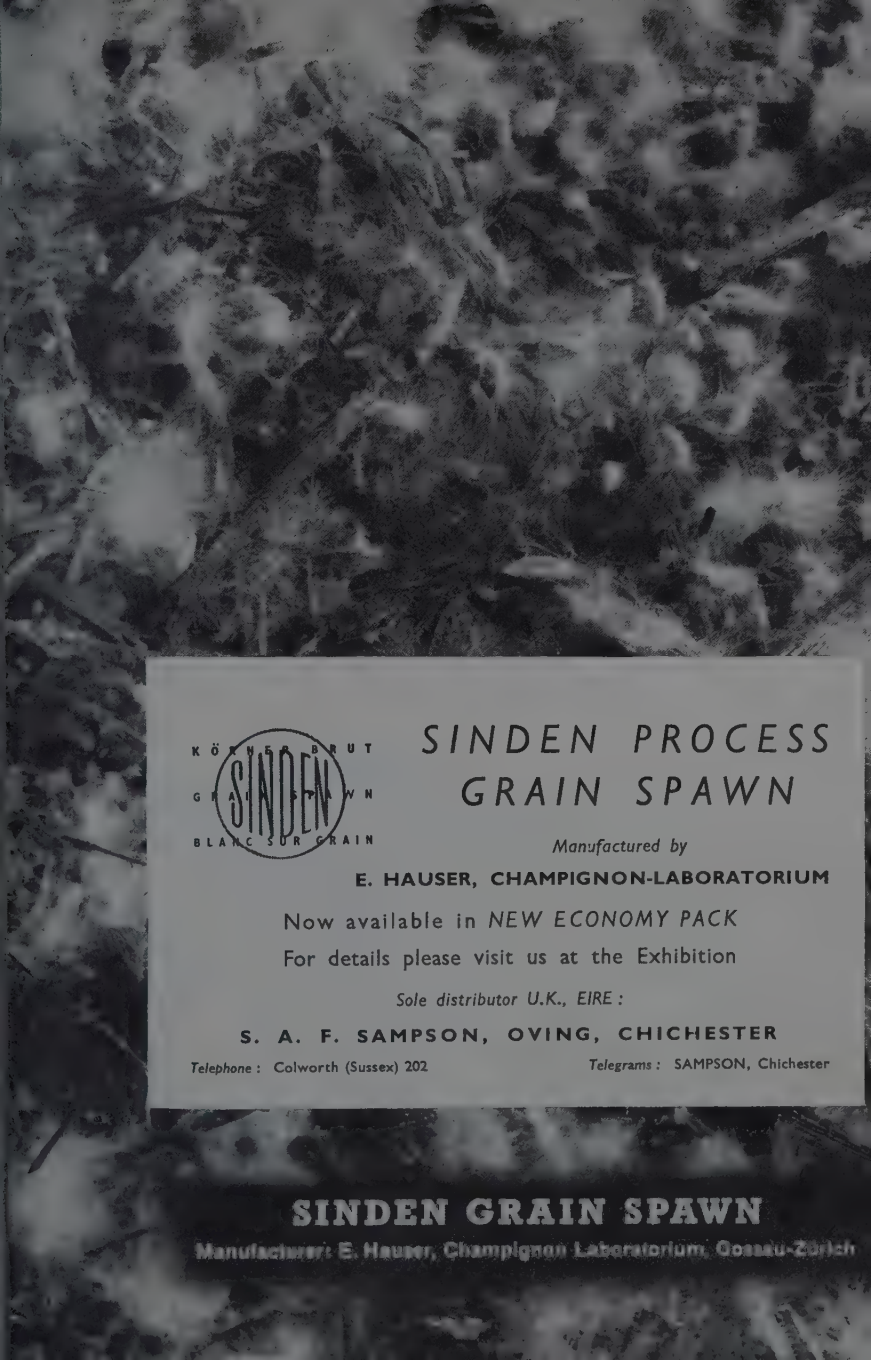
By a Staff Correspondent, The Commercial Grower

In the heart of London's industrial area, not half a mile from the Tower of London, I watched mushrooms being picked last week. On a former bomb site, surrounded by towering factory chimneys, the Bermondsey Mushroom Partnership, formed in 1949 by three Polish gentlemen who had just left the British Army, is flourishing and supplying some of London's largest hotels and Covent Garden and Spitalfield markets with top grade produce.

In February, 1949, Mr. K. Rozanski and Mr. Z. Zaklika, with very little money, no knowledge of mushroom growing but with great courage and faith in their own capabilities, started work on clearing a bomb site in Maltby Street, Bermondsey, which had been used as a dumping ground for all the rubbish and debris from the many bombed buildings in the area. With their total assets adding up to a pick, shovel, two buckets and two baskets, they undertook the tremendous task of clearing the rubble.

Clearing the site was only a matter of time and application to the job, but before they could start laying the foundations of the huts in which they were to grow mushrooms a fence had to be erected. The holes for the fence posts were dug and the concrete in which to set the posts, mixed with water carried over 300 yards to the site, for they were unable to get a water supply or electricity installed until some buildings were erected.

With great pride the posts were cemented into their holes and the two partners went home with the satisfactory knowledge that they had at last laid the foundation stone of their enterprise. But next morning the posts were gone. New ones were obtained, not easily, for the partners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were working to such a fine budget that every penny had to be made to count. But the new posts also vanished overnight, and it must have been with the deepest despair that they erected the third set and then kept a night-long vigil to ensure that they were not stolen as well.

But that was the turning point. The fence was erected and the foundation of the first mushroom shed was laid. All the old stones and bricks from the site formed the foundation and on this a concrete floor was laid. And then, without any outside help whatever, the ex-Canadian army hut was built.

The end of the Winter of 1949 was severe and the partners were hampered by heavy snowfalls and the short days which curtailed their work before they wanted to finish, but the evenings were not wasted and the time was spent in reading books on mushroom growing and trying to remember the botany that both had taken at university.

In the April of 1949 the shed was finished and the basis of the first crop was laid. It did well in its early stages, luck smiling on the novices, for both Mr. Zaklika and Mr. Rozanski had never grown mushrooms before—Mr. Zaklika having formerly been an Inspector of Foresty and Mr. Rozanski having owned a stone quarry.

But luck did not stay with them long. The Summer of 1949 was as hot as the Winter had been cold and soon they were finding great difficulty in keeping down the temperatures of the shed. They solved this by carrying buckets of water from the nearest tap—a little closer then than when they were mixing cement—and the water was sprayed on the roof. It did the trick, but the yield was poor, about half a pound per square foot.

Double skinned roofs

Since 1949 the partners have not looked back. The partnership was increased to three with the arrival of another Pole, Mr. J. Sabuea, and together they have now expanded to five sheds with 10,500 square feet of production surface.

The huts had only single roofs when they were delivered, but this was made into a double skin and insulation was packed between the two layers. Steel scaffolding holds the ex-air raid shelter bunks which form the basis of the beds, the metal frame mattresses of the bunks being reinforced with wire mesh so that short compost would not fall through.

Heating when the project was first started was something of a headache. Electric fires were the first method, but with electricity at 5d. a unit for lighting and 3d. a unit for power, this became uneconomic and sawdust stoves were devised. These stoves, made from 40 gallon oil drums proved effective, but required a lot of ventilation. Now these have been dispensed with and together the partners installed boilers and hot water pipes which are now laid throughout the sheds.

Another more recent innovation is the electric air conditioning plant, again made by the partners from salvaged material. This air conditioner is so arranged that each of the five tier beds in each of the

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five sheds received ample circulation of air. The conditioner can be run at two speeds and has an infinite control in each shed and to each bed in the tiers.

To overcome the trouble of the sheds heating up too much during the Summer, spray lines have been fitted to the roof of each and Mr. Zaklika said that this had proved most efficient and a short run with the water was enough to drop the temperature in the houses by ten to fifteen degrees.

At the beginning the partnership used casing soils bought from contractors, but they soon found that the material they were getting was not sterile and they have now changed over to using special sterilised peat.

They have two concrete composting sites on the " farm " and the staff have to turn 26 to 28 tons of compost every five days. Because of space restrictions—and literally, not a square foot of the area is wasted—they have no mechanical aids.

A grain spawn imported from Switzerland is used. This, the partners state, is most satisfacotory and and arrives by air in first-class condition. Yield has been increased since they started by more than 150 per cent.

Marketing of the produce is mostly direct to the customer and the partnership has several large London hotels on its books. Mushrooms picked in the evening can be served at breakfast to the guests in the hotels the following morning. Grading and packing is watched most carefully and is considered of primary importance.

All Polish staff

The staff comprises three men and a woman to clean and prepare the mushrooms. All are Polish and together they work as a close knit team, not afraid of hard work or long hours.

The partners arrive before seven o'clock in the mornings and it is generally after 10 p.m. before they leave and though they will not admit it, the secret of their success lies in their ability to work extremely hard.

The welfare of the staff is not overlooked and a small but extremely clean and airy hut has been built for use as a staff canteen and changing room.

They have had their troubles since the partnership was formed. They had disease, but have overcome the trouble. This year they had a fire which damaged two of the sheds rather badly and threw out of gear a part of their cropping programme. But they are happy and confident, their only main trouble being that they cannot expand further.

LEICESTERSHIRE FARM WALK

Members of the MGA, with their wives and foremen, will be welcome at a farm walk to be held at two o'clock on Saturday afternoon, 30th October, at SHADOWLAWN PRODUCTS, KIMCOTE, near RUGBY, by kind invitation of Mr. Norman Cooper, a tray-growing member of the Executive Committee.

Pre-packaging Mushrooms

The Produce Pre-Packaging Research Association Ltd. is sponsored by the Farmers' Central Organisation (set up by the NFU to foster co-operative enterprise in agriculture). The entrance fee is 100 guineas and the first year's subscription 50 guineas.

The Grower reports (3.7.54): The Association will test many different types of packaging materials and machinery and the methods of distribution and marketing of a large number of pre-packed commodities . .

At Worthing, the first trials concerned the use of cartons for mushrooms and of various types of wrapping materials for apple and tomatoes.

Press Cuttings

Mushrooms were in very good demand. Sendings were very light for the time of year. *Commercial Grower*, 17.9.54.

It is extraordinary how many houses have doors and a central path too narrow to take the popular flat trucks used for general transport on so many mushroom farms.

Dr. R. L. EDWARDS in *Grower*, 22.5.54.

The shrieks and howls of growers against this iniquitous habit of peeling cultivated mushrooms has not got far.

ROBERT PATTERSON in *Commercial Grower*, 28.5.54.

MGA members won the mushroom classes at the Sussex County Show at Eastbourne. R. J. Hopkins was 1st. in the class for cups and 2nd. and 3rd. in the buttons class whilst, M. M. Faulkner won the class for buttons and gained 2nd. prize with his cups.

SMALL ADVERTISEMENTS (3d. a word)

(*Continued inside back cover*)

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The empty cropping houses, Laboratory and ancillary buildings, and about $1\frac{1}{2}$ acres of land comprising the site of the Yaxley Mushroom Research Station (now transferred to Littlehampton) are offered for sale by private treaty by the Directors of the Mushroom Research Association Ltd., with vacant possession on 31st December, 1954.

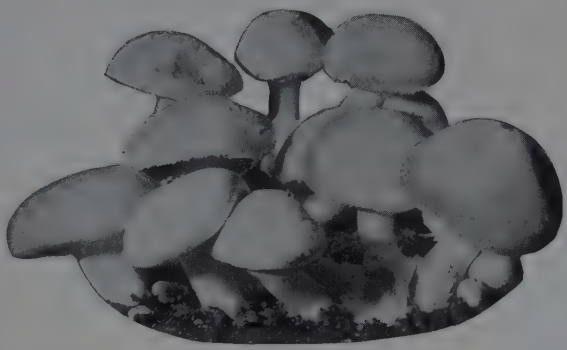
Offers must be received not later than 31st October, 1954, by the Secretary of the Association (address Yaxley, Peterborough), who will be glad to provide any further information required by a prospective purchaser and to make arrangements for inspection.

J. E. R. SIMONS LTD.

We shall be pleased to welcome old friends and new at our Stand at the Mushroom Industry Exhibition at Tunbridge Wells, on 6th and 7th October, 1954.

HARLOW - ESSEX

To **ALL MUSHROOM GROWERS**



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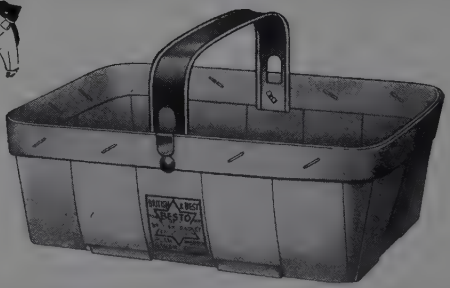

Tunbridge Wells Show, 6-7th Oct.

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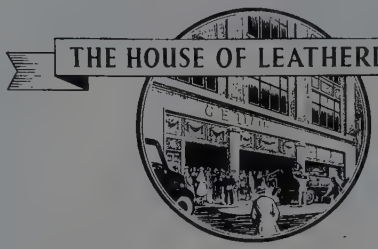

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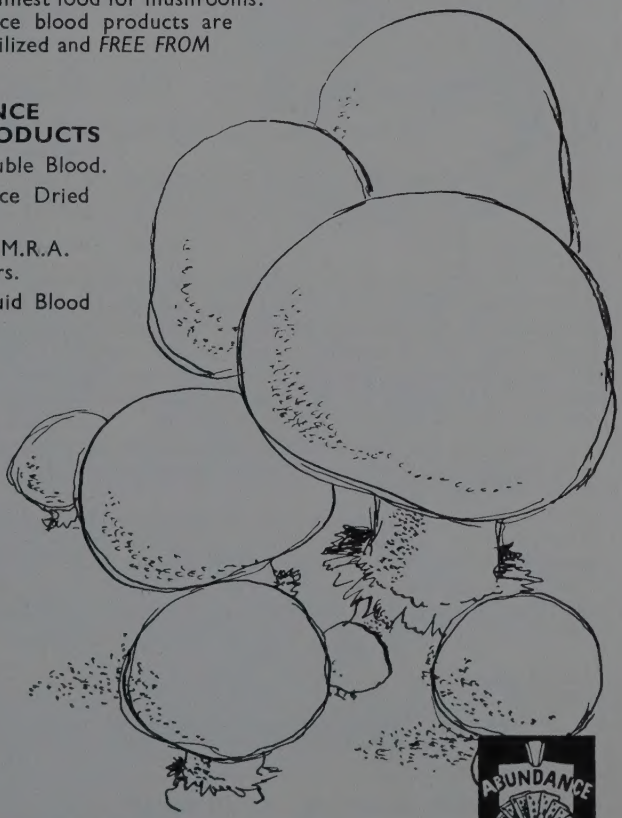

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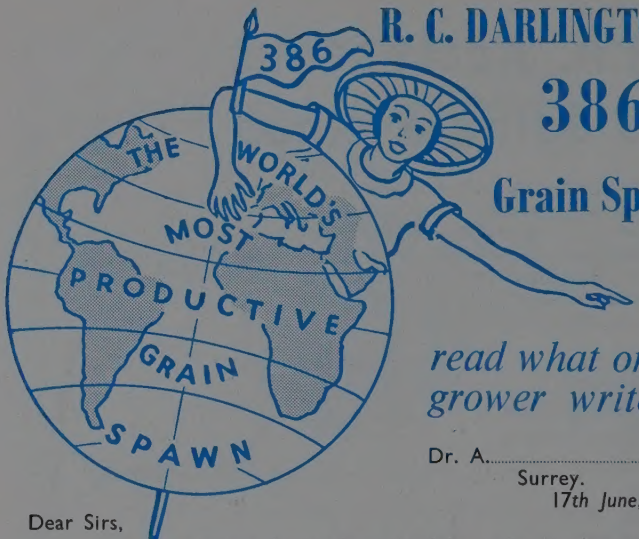

R. C. DARLINGTON'S

386

Grain Spawn

read what one grower writes

Dr. A.....
Surrey.
17*th June*, 1954.

Dear Sirs,

. . . . . your spawn, having been used by us for the first time, is still a strange field with which we are not fully acquainted but, nevertheless, with our first trial it is proving very successful and offers growers much scope for improved production and adaption. Undoubtedly growers will use this product in the near future as it is evident that on our first growing the spawn, as such, is not only very successful but is the *best we have had the pleasure of handling.*

Having spawned a house (tray system), this was cased after twelve days, *the first mushrooms appeared after fifteen days and the first ones were picked after eighteen days.*

I wish to draw your attention to the fact, when being cased after fifteen days, we could see not only a vigorous spawn run, but every appearance of a *very promising crop.* The spawn itself is of remarkable quality and the mushrooms are of an equivalent nature in general. I can assure you that these mushrooms are *as good in taste as they are in texture* and, therefore, yours is the *product of the future.*

Yours faithfully,

(*Signed*) Dr. A.....

R. C. DARLINGTON LTD.

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HEAD OFFICE :

WILLOW LABORATORIES
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SMALL ADVERTISEMENTS—(*continued on page 341*)

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